

## CLAIMS

- 1    1.     A magnetic head for a hard disk drive, comprising:  
2           a write head portion, including:  
3           a first magnetic pole;  
4           a second magnetic pole having a relatively large yoke portion and a narrow pole  
5    tip;  
6           a pole tip heating element being disposed proximate said pole tip for providing  
7    heat energy thereto.
  
- 1    2.     A magnetic head as described in claim 1 wherein said write head portion further  
2    includes an induction coil being disposed in part between said first magnetic pole and  
3    said second magnetic pole and wherein said heating element is electrically connected  
4    with said induction coil.
  
- 1    3.     A magnetic head as described in claim 2 wherein said heating element is  
2    electrically connected in series with said induction coil.
  
- 1    4.     A magnetic head as described in claim 3 wherein said heating element includes a  
2    first electrical lead, a relatively narrow heating portion and a second electrical lead, and  
3    wherein said first electrical lead is electrically connected with an electrical interconnect  
4    contact pad of said induction coil.

1 5. A magnetic head as described in claim 4 wherein said heater portion of said  
2 heating element is comprised of a thin film material, and said electrical leads are  
3 comprised of one or more layers of electrically conductive material.

1 6. A magnetic head as described in claim 1 wherein a write gap layer is disposed  
2 between said first magnetic pole and said second magnetic pole tip, and wherein said  
3 heating element is disposed on a side of said pole tip that is away from said write gap  
4 layer, such that said pole tip is disposed between said write gap layer and said heating  
5 element.

1 7. A magnetic head as described in claim 6 wherein said write head portion further  
2 includes an induction coil being disposed in part between said first magnetic pole and  
3 said second magnetic pole and wherein said heating element is electrically connected  
4 with said induction coil.

1 8. A magnetic head as described in claim 7 wherein said heating element is  
2 electrically connected in series with said induction coil.

1 9. A magnetic head as described in claim 1 wherein said heating element has an  
2 electrical resistance of approximately .2 to 1.0 ohms.

1 10. A magnetic head as described in claim 1 wherein the heating energy of the  
2 heating element is approximately .3 to 1.6 mW.

1 11. A magnetic head as described in claim 1 wherein said heating element includes at  
2 least two legs, wherein a first said leg provides heat energy to said pole tip and a second  
3 leg provides an alternative electrical path for electrical current passing through said  
4 heating element.

1 12. A magnetic head as described in claim 1, wherein a write gap layer is disposed  
2 between said first magnetic pole and said second magnetic pole yoke, and wherein said  
3 heating element is disposed between said write gap layer and said yoke.

1 13. A magnetic head as described in claim 2 wherein said heating element is  
2 comprised of a material selected from the group consisting of Cu, W, NiFe, NiCr and  
3 IrRh.

1 14. A hard disk drive including a magnetic head, comprising:  
2 at least one magnetic media disk;  
3 at least one actuating arm for holding the magnetic head;  
4 wherein the magnetic head includes:  
5 a write head portion, including:  
6 a first magnetic pole;

7           a second magnetic pole having a relatively large yoke portion and a narrow pole  
8 tip;  
9           a pole tip heating element being disposed proximate said pole tip for providing  
10 heat energy thereto.

1   15.    A hard disk drive including a magnetic head as described in claim 14 wherein said  
2 write head portion further includes an induction coil being disposed in part between said  
3 first magnetic pole and said second magnetic pole and wherein said heating element is  
4 electrically connected with said induction coil.

1   16.    A hard disk drive including a magnetic head as described in claim 15 wherein said  
2 heating element includes a first electrical lead, a relatively narrow heating portion and a  
3 second electrical lead, and wherein said first electrical lead is electrically connected with  
4 an electrical interconnect contact pad of said induction coil.

1   17.    A hard disk drive including a magnetic head as described in claim 14 wherein a  
2 write gap layer is disposed between said first magnetic pole and said second magnetic  
3 pole tip, and wherein said heating element is disposed on a side of said pole tip that is  
4 away from said write gap layer, such that said pole tip is disposed between said write gap  
5 layer and said heating element.

1   18.    A hard disk drive including a magnetic head as described in claim 17 wherein said  
2 write head portion further includes an induction coil being disposed in part between said

3 first magnetic pole and said second magnetic pole and wherein said heating element is  
4 electrically connected with said induction coil.

1 19. A hard disk drive including a magnetic head as described in claim 14 wherein said  
2 heating element has an electrical resistance of approximately .2 to 1.0 ohms.

1 20. A hard disk drive including a magnetic head as described in claim 14 wherein the  
2 heating energy of the heating element is approximately .3 to 1.6 mW.